भारतीय मानक

Indian Standard

IS 4751 : 2023

पोटेशियम मैटाबाईसल्फाइट, खाद्य ग्रेड — विशिष्टि

(दूसरा पुनरीक्षण)

Potassium Metabisulphite, Food Grade — Specification

(Second Revision)

ICS 67.220.20

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

January 2023 **Price Group 6**

Food Additives Sectional Committee, FAD 08

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Food Additives Sectional Committee had been approved by the Food and Agriculture Division Council.

Food additives are added to improve the appearance, flavour, texture or storage properties of processed foods. As certain impurities in these substances have been found to be harmful, it is necessary to have a strict quality control of these food additives. A series of standards have, therefore, been prepared by Bureau of Indian Standards to cover purity and identification of these substances. It is hoped that these standards would help in checking purity at the stage of manufacture, for it is extremely difficult (and in many cases impossible) to detect the impurity once these substances have been added to the processed foods. Besides, these standards are intended to guide the indigenous manufacturers in making their product conform to specifications that are accepted by scientists, health authorities and national/international bodies.

Potassium metabisulphite is widely used as food preservative and is permitted under the Food Safety and Standards (Food Products Standards and Food Additives) Regulation, 2011.

Chemical Names and Formula — The recognized chemical names are potassium metabisulphite, potassium disulphite, potassium pentaoxodisulphate and potassium pyrosulphite. Empirical formula of potassium metabisulphite is K_2S_2O5. Its molecular weight is 222.23.

This standard was first published in 1968. It was first revised in 1994 to take into consideration the requirements given in the following International Standards:

a) FAO Food and Nutrition Paper No. 4 Specification for identity and purity of-thickening agents, anticaking agents, antimicrobials, antioxidants and emulsifiers; published by the Joint FAO/WHO Expert Committee on Food Additives, Rome 1978;

b) Food Chemical Codex, 1981 Pub. National Academy of Sciences, and National Research Council, Washington DC, USA;

c) Council Directive 65/66/EEC of 26 January 1965 laying down specific criteria of purity for preservatives authorized for use in foodstuffs intended for human consumption.

In the first revision, solubility was brought under description. It was intended only as information regarding approximate solubility and not to be considered as a quality requirement. The limit of 'thiosulphate' and 'iron' was made more stringent and the requirement for lead was substituted by heavy metals.

This second revision of the standard has been brought out to incorporate the amendments issued to the standard and also to align the requirements of the product with Food Safety and Standards (Food Product Standards and Food Additives) Regulations, 2011. Requirement of lead has been incorporated deleting the requirement of 'Heavy Metals'.

A scheme for labelling environment friendly products known as ECO — Mark has been introduced at the instance of the Ministry of Environment Forest and Climate and Change, Government of India which is based on the Gazette Notification No. 215(E) dated 17 May 1996 for Labelling Food Additives as environment friendly products, published by the Ministry of Environment and Forests. The ECO Mark would be administered by the Bureau of Indian Standards (BIS) under the Bureau of Indian Standards Act, 2016 as per the Resolution No. 71 dated 20 February 1991 as published in the Gazette of the Government of India vide GSR No. 85(E) dated 21 February 1991. For a product to be eligible for ECO Mark it shall also carry the Standard Mark of BIS for quality besides meeting additional environmental friendly requirements.

The composition of the Committee responsible for the formulation of this standard is listed in Annex F.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

POTASSIUM METABISULPHITE, FOOD GRADE — SPECIFICATION

(Second Revision)

1 SCOPE

This standard prescribes the requirements and the method of sampling and test for potassium metabisulphite for use as food preservative.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below :

IS No.	*Title*
IS 265 : 2021	Hydrochloric acid specification (*fifth revision*)
IS 1070 : 1992	Reagent grade water — Specification (*third revision*)
IS 1699 : 1995	Methods of sampling and test for food colours (*second revision*)

3 REQUIREMENTS

3.1 Description

The material shall be white or colourless, free flowing crystals, crystalline powder or granules usually having an odour of sulphur dioxide. It gradually oxidizes in air to sulphate. Potassium metabisulphite is soluble in water but insoluble in ethanol.

NOTE — The solubility is intended only as information regarding approximate solubility and is not to be considered as a quality requirement and is of minor significance as a means of identification or determination of purity and dependence must be placed on other specifications.

3.2 Identification Test

3.2.1 Solution of the material shall be acidic to a solution of phenol red.

3.2.2 Solution of the material shall decolourize a solution of iodine.

3.2.3 A 10 percent solution of the material shall give a positive test for ‘potassium’ given in **3.2.3.1** and positive test for ‘sulphite’ given in **3.2.3.2**.

3.2.3.1 *Test for Potassium*

When sodium bitartrate is added to a neutral 10 percent solution of the material, a white precipitate shall be formed. This precipitate shall be soluble in ammonia and in solutions of alkali hydroxides or carbonates.

3.2.3.2 *Test for Sulphite*

When dilute hydrochloric acid is added to a neutral 10 percent solution of the material, sulphur dioxide shall be produced which may be recognized by its characteristic odour. This gas shall blacken the filter paper moistened with mercurous nitrate.

3.3 The material shall also conform to the requirements given in Table 1.

Table 1 Requirements for Potassium Metabisulphite
(*Clauses* 3.3, 3.4.2.1, 3.4.2.2 *and* 6.1)

Sl. No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Purity, as $K_2S_2O_5$, percent by mass, *Min*	90	Annex A
ii)	Water insoluble matter, percent by mass, *Max*	0.05	Annex B
iii)	Thiosulphate, percent by mass *Max*	0.1	Annex C
iv)	Arsenic (as As), mg/kg, *Max*	3.0	**15** of IS 1699
v)	Iron (as Fe), mg/kg, *Max*	5	Annex D
vi)	Selenium (as Se), mg/kg, *Max*	5	Annex E
vii)	*p*H	Acidic to litmus	-
viii)	Lead (as Pb), *mg/kg, Max*	2	**15** of IS 1699

3.4 Additional Requirements for ECO-Mark

3.4.1 *General Requirements*

3.4.1.1 The product shall conform to the requirements prescribed under **3.1** to **3.3**.

3.4.1.2 The product manufacturer shall produce the consent clearance as per the provisions of the *Water* (*Prevention & Control of Pollution*) *Act*, 1974, the *Water (Prevention & Control of Pollution*) *Cess Act*, 1977 and the *Air (Prevention & Control of Pollution) Act*, 1981 along with the authorization, if required, under the *Environment (Protection) Act*, 1986 and the Rules made thereunder to Bureau of Indian Standards while applying for ECO-Mark; and the product shall also be in accordance with the *Food Safety and Standards Act*, 2006 and the Rules made thereunder.

3.4.1.3 The product/packing shall display in brief the criteria based on which the product has been labelled as environment friendly.

3.4.1.4 The material used for product packaging shall be recyclable or biodegradable.

3.4.1.5 The product package or leaflet accompanying it may display instructions of proper use and storage so as to maximize the product performance, safety and minimize wastage.

3.4.2 *Specific Requirements*

3.4.2.1 In Table 1, the requirement for assay (purity) specified under Sl. No. (i) shall not be less than 95.0 percent by weight of $K_2S_2O_5$, in place of the existing requirement, for the product to be eligible for the ECO-Mark.

3.4.2.2 In Table 1, the requirement for arsenic specified under Sl. No. (iv) shall not be less than 1.5 ppm, in place of the existing, for the product to be eligible for the ECO-Mark.

4 PACKING, STORAGE AND MARKING

4.1 Packing

The material shall be securely packed in well-filled container with a minimum access to air and light. The containers shall be such as to preclude contamination of the contents with metals or other impurities.

4.2 Storage

The material shall be stored in a cool and dry place so as to avoid excessive exposure to heat.

4.3 Marking

4.3.1 Each container shall be legibly and indelibly marked with the following information:

a) Name of the material, including the words 'Food Grade';

b) Name of the manufacturer or his registered trade-mark, if any;

c) Net quantity when packed;

d) Lot/Batch No.;

e) Month and year of manufacture;

f) Best before .....months from manufacture; and

g) Any other requirements as specified under the Legal Metrology (Packaged Commodities) Rules, 2011 and Food Safety and Food Safety and Standards (Packaging) Regulations, 2018 and Food Safety and Standards (Labelling and Display) Regulations, 2020.

4.3.2 *BIS Certification Marking*

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provision of *Bureau of Indian Standards Act*, 2016 and Rules and Regulation framed there under and the product(s) may be marked with the Standard Mark.

4.3.3 *ECO-Mark*

The product may also be marked with the ECO-Mark, the details of which may be obtained from Bureau of Indian Standards.

5 SAMPLING

Representative samples of the material shall be drawn according to the method prescribed in **4** of IS 1699.

6 TESTS

6.1 Tests shall be carried out by the methods as specified in **3.2** and co1 **4** and **5** of Table 1.

6.2 Quality of Reagents

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the experimental results.

ANNEX A
[*Table* 1, *Sl. No.* i)]

DETERMINATION OF PURITY

A-1 REAGENTS

A-1.1 Standard Iodine Solution — 0.1 N, freshly standardized.

A-1.2 Concentrated Hydrochloric Acid — conforming to IS 265.

A-1.3 Standard Sodium Thiosulphate Solution — 0.1 N, freshly standardized.

A-1.4 Starch Solution

Mix 1 g of starch and 10 mg of red mercuric iodide and sufficient cold water to make a thin paste. Add 200 ml of boiling water, boil for 1 minute with continuous stirring and cool. Use only the clear solution.

A-2 PROCEDURE

Weigh accurately about 0.25 g of the material and add it to exactly 50 ml of standard iodine solution contained in a glass stoppered flask and stopper the flask. Allow to stand for 5 minutes, add 1 ml of concentrated hydrochloric acid and titrate the excess of iodine with standard sodium thiosulphate solution, adding starch indicator solution towards the end of the titration. Each ml of 0.1 N iodine is equivalent to 5.558 mg of $K_2S_2O_5$.

ANNEX B
[*Table* 1, *Sl. No.* ii)]

DETERMINATION OF WATER INSOLUBLE MATTER

B-1 PROCEDURE

B-1.1 Dissolve about 10 g of the material, accurately weighed, in 50 ml of water. Filter through weighed Gooch crucible fitted with an asbestos pad or through a weighed sintered glass crucible (G No. 4), previously washed and dried at 105 °C to 110 °C and wash well with water. Dry the residue to constant mass at 105 °C to 110 °C.

B-1.2 Matter insoluble in water, percent by mass =

$$\frac{100\ M_1}{M_2}$$

where

M_1 = mass, in g, of the residue; and

M_2 = mass, in g, of the material taken for the test.

ANNEX C
[*Table* 1, *Sl. No.* iii)]

DETERMINATION OF THIOSULPHATE

C-1 REAGENTS

C-1.1 Potassium Bromide and Mercuric Chloride Mixture (The Reagent)

Dissolve 25 g of potassium bromide and 25 g of mercuric chloride in 900 ml of distilled water at about 52 °C. Cool and dilute to one litre and allow to stand overnight. Filter, if necessary to obtain perfectly clear solution.

C-1.2 Standard Thiosulphate Solution

Freshly prepared by diluting 2.0 ml of 0.1 N sodium thiosulphate to one litre.

C-2 PROCEDURE

Dissolve 5 g ± 0.1 g of the sample in distilled water and dilute to 100 ml. Add 10 ml of the reagent (**C-1.1**) to a 50 ml Nessler tube or any other suitable test tube and in it slowly pipette one ml of the solution. To another 50 ml Nessler tube or any other suitable tube and 10 ml of the reagent (**C-1.1**) and 2.0 ml of standard sodium thiosulphate solution. Allow both the tubes to stand for 15 minutes without agitation, then agitate carefully to distribute the opalescence. The opalescence of the sample shall not be more than that the tube containing the standard.

ANNEX D
[*Table* 1, *Sl. No.* v)]

DETERMINATION OF IRON

D-1 REAGENTS

D-1.1 Bromine Solution

Prepare a saturated solution of bromine by agitating 2 to 3 ml of bromine with 100 ml of cold water in a glass stoppered bottle, the stopper of which should be lubricated with petroleum. Store in a cool place and protect from light.

D-1.2 Hydrochloric Acid

D-1.3 Ammonium Persulphate

D-1.4 Ammonium Thiocyanate Solution

Dissolve 8 g of ammonium thiocyanate (NH_4CNS) in sufficient water to make 100 ml.

D-1.5 Standard Iron Solution — 10 µg Fe

D-2 PROCEDURE

To one gram of the sample add 2 ml of hydrochloric acid and evaporate to dryness on a steam- bath. Dissolve the residue in 2 ml of hydrochloric acid and 20 ml of water, add a few drops of bromine solution, and boil the solution to remove the bromine. Cool and dilute with water to 25 ml. Then add 50 mg of ammonium persulphate and 5 ml of ammonium thiocyanate solution. Any red or pink colour shall not exceed that produced in a control containing 1.0 ml of standard iron solution (10 µg Fe).

ANNEX E
[*Table* 1, *Sl. No.* vi)]

DETERMINATION OF SELENIUM

E-1 REAGENTS

E-1.1 Selenium Stock Solution

Transfer 120.0 mg of metallic selenium (Se) into a 1 000 ml volumetric flask, add 100 ml of dilute nitric acid (1 in 2), warm gently on a steam bath to effect solution and dilute to volume with water. Transfer 5.0 ml of this solution into a 200 ml volumetric flask, dilute to volume with water and mix. Each millilitre of this solution contains 3 µg of selenium ion (Se).

E-1.2 Standard Selenium Solution

Just prior to use, transfer 20.0 ml of selenium stock solution (60 µg Se) into a 200 mm X 25 mm test tube. Add 20 ml of hydrochloric acid and mix.

E-1.3 Sample Solution

Transfer 2.0 g of the sample to a 250 ml Erlenmeyer flask and cautiously add 10 ml of 30 percent hydrogen peroxide. After the initial reaction has subsided, add 6 ml of 70 percent perchloric acid, heat slowly until white fumes of perchloric acid are copiously evolved, and continue heating gently for a few minutes to ensure decomposition of any excess peroxide. If the solution is brownish in colour due to undecomposed organic matter, add a small portion of the peroxide solution and heat again to white perchloric acid fumes, repeating if necessary until decomposition of the organic matter is completed and a colourless solution is obtained. Cool, add 10 ml of water and filter into a 200 mm X 25 mm test-tube. Wash the filter with hot water until the filtrate measures 20 ml, add 20 ml of hydrochloric acid and mix.

E-2 PROCEDURE

Place the test tubes containing the standard selenium solution and the sample solution in a water- bath and heat until the temperature of the solution reaches 40 °C. To each tube add 400 mg of ascorbic acid, stir until dissolved and maintain at 40 °C for 30 minutes. Cool the solution, dilute with water to 50 ml and mix. Any pink colour produced by the sample shall not exceed that produced by the standard.

ANNEX F
(*Foreword*)

COMMITTEE COMPOSITION
Food Additives Sectional Committee, FAD 08

Organization	*Representative(s)*
CSIR-Indian Institute of Toxicology Research, Lucknow	DR YOGESHWAR SHUKLA (***Chairperson***)
All India Food Processors Association, (India)	MS SHREYA PANDEY SHRI KRISHNA KUMAR JOSHI (*Alternate*)
Association of Food Scientists and Technologists India, Mumbai	DR VIKAS SINGH CHAUHAN DR NANDINI P. SHETTY (*Alternate*)
Bose Institute, Kolkata	PROFESSOR GAOURISHNKAR
CSIR-Central Food Technological Research Institute, Mysore	DR NGASEPPAM IBOYIAMA SHRI ARUNA KUMAR (*Alternate*)
Confederation of Indian Food Trade and Industry, New Delhi	DR JASVIR SINGH MS PRIYANKA SHARMA (*Alternate*)
Confederation of Indian Industry, New Delhi	MS NEHA AGGARAWAL MS MAMTA ARORA BUDHIRAJA (*Alternate*)
Consumer Education and Research Centre, Ahmedabad	MS ANINDITA MEHTA MS DOLLY A. JANI (*Alternate*)
Consumer Guidance Society of India, Mumbai	DR SITARAM DIXIT DR M. S. KAMATH (*Alternate*)
Defence Food Research Laboratory, Mysore	DR G. K. SHARMA DR D. D. WADIKAR (*Alternate*)
Department of Chemical Technology, University of Calcutta	PROFESSOR ARUP MUKHERJEEE DR FAROOQUE ABDULLAH (*Alternate*)
Envirocare Labs Private Limited, Thane	DR PRITI AMRITKAR DR NILESH AMRITKAR (*Alternate*)
Food Ingredients Manufacturers & Suppliers of India Association	SHRI FIROZ H. NAQVI
Grasim Industry	SHRI PANKAJ KUMAR GUPTA
ICMR-National Institute of Nutrition, Hyderabad	DR J. PADMAJA
Indian Institute of Chemical Technology, Hyderabad	DR ASHOK KUMAR TIWARI DR T. KUMARAGURU (*Alternate*)
Indian Pharmacopoeia Commission, Ghaziabad	MS SHRUTI RASTOGI SHRI JAI SHIV CHAUHAN (*Alternate*)
Indian Salt Manufacturers Association, Ahmedabad	SHRI B. C. RAWAL SHRI P. R. DHRUVE (*Alternate*)

Organization	*Representative(s)*
Institute of Chemical Technology, Mumbai	DR UDAY S. ANNAPURE PROF REKHA SINGHAL (*Alternate*)
Office of the Salt Commissioner, Jaipur	SHRI M. A. ANSARI SHRI B. S. NAGAR (*Alternate*)
Protein Foods and Nutrition Development Association of India, Mumbai	SHRI BHUPINDER SINGH DR JAGADISH PAI (*Alternate*)
Roha Dyechem, Mumbai	SHRI ZAINULABIDIN DHANSE
VR Food Tech Private Limited	DR ASHLESH PARCHURE DR N. RAM (*Alternate*)
BIS Directorate General	MS SUNEETI TOTEJA SCIENTIST 'E'/DIRECTOR AND HEAD (FOOD AND AGRICULTURE DEPARTMENT) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
SHRI KULDEEP MITTAL
SCIENTIST 'B'/ASSISTANT DIRECTOR
(FOOD AND AGRICULTURE DEPARTMENT), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

This Indian Standard has been developed from Doc No.: FAD 08 (18329).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	2323 7617
Eastern	: 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	2367 0012 2320 9474
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	265 9930
Southern	: C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	2254 1442 2254 1216
Western	: Plot No. E-9, Road No.-8, MIDC, Andheri (East), Mumbai 400093	2821 8093

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. CHANDIGARH. CHENNAI. COIMBATORE. DEHRADUN. DELHI. FARIDABAD. GHAZIABAD. GUWAHATI. HIMACHAL PRADESH. HUBLI. HYDERABAD. JAIPUR. JAMMU & KASHMIR. JAMSHEDPUR. KOCHI. KOLKATA. LUCKNOW. MADURAI. MUMBAI. NAGPUR. NOIDA. PANIPAT. PATNA. PUNE. RAIPUR. RAJKOT. SURAT. VISAKHAPATNAM.

Published by BIS, New Delhi